

Claim Amendments

1-16. (canceled)

17. (currently amended) A glass substrate for a flat panel liquid-crystal display, such as for a laptop computer, the flat panel liquid-crystal display including a twisted nematic display, a supertwisted nematic display, an active matrix liquid-crystal display, a thin film transistor display, and a plasma addressed liquid-crystal display, said substrate comprising:

an alkali-free aluminoborosilicate glass;

said glass having a coefficient of thermal expansion $\alpha_{20/300}$ of between $2.8 \times 10^{-6}/K$ and $3.8 \times 10^{-6}/K$;

said glass having the composition (in % by weight, based on oxide):

| | |
|--------------------------------|-------------|
| SiO ₂ | > 58 - 64.5 |
| B ₂ O ₃ | > 6 - 10.5 |
| Al ₂ O ₃ | > 18 - 24 |
| MgO | 0 - < 3 |
| CaO | 1 - < 8 |
| SrO | 0.1 - 1.5 |
| BaO | > 5 - 8 |

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with SrO + BaO < 8.5

with MgO + CaO + SrO + BaO 8 - 18

ZnO ~~0.4~~ 0 - < 2;

said glass being configured to be resistant to thermal shock;
said glass being configured to have a high transparency over a
broad spectral range in the visible and ultra violet ranges; and
said glass being configured to be free of bubbles, knots,
inclusions, streaks, and surface undulations.

18-19. (canceled)

20. (currently amended) A glass comprising:

a substantially alkali-free aluminoborosilicate glass;

said glass having a coefficient of thermal expansion $\alpha_{20/300}$ of
between $2.8 \times 10^{-6}/K$ and $3.8 \times 10^{-6}/K$;

said glass having the composition (in % by weight, based on
oxide):

SiO₂ > 58 - 65

B₂O₃ > 6 - 10.5

Al₂O₃ > 14 - 25

MgO 0 - < 3

CaO 0 - 9

| | |
|----------------------------|--------------------------------|
| SrO | 0.1 - 1.5 |
| BaO | > 5 - 8.5 |
| with SrO + BaO | ≤ 8.6 |
| with MgO + CaO + SrO + BaO | 8 - 18 |
| ZnO | 0.1 <u>0</u> - < 2. |

21-51. (canceled)

52. (new) The glass substrate according to Claim 17, wherein said glass substrate comprises a glass having a content of at least 0.1% by weight of ZnO.

53. (new) The glass substrate according to Claim 52, wherein said glass substrate comprises a glass having a glass transition temperature, T_g , of more than 700 degrees Celsius to maximize heat resistance of said glass substrate.

54. (new) The glass substrate according to Claim 53, wherein said glass substrate comprises a glass having (i.) and (ii.), wherein (i.) and (ii.) are:

(i.) a processing temperature, V_A , of at most 1350 degrees Celsius at a viscosity of 10^4 dPas; and

(ii.) a temperature of at most 1720 degrees Celsius at a viscosity of 10^2 dPas.

55. (new) The glass substrate according to Claim 54, wherein said glass substrate comprises a glass having a content of more than 8% by weight of B_2O_3 .

56. (new) The glass substrate according to Claim 55, wherein said glass substrate comprises a glass having a content of one of:

at least 18% by weight of Al_2O_3 ;

more than 18% by weight of Al_2O_3 ;

at least 20.5% by weight of Al_2O_3 ; and

at least 21.5% by weight of Al_2O_3 .

57. (new) The glass substrate according to Claim 56, wherein said glass substrate comprises a glass containing additionally (in % by weight):

| | |
|----------------------|---------|
| ZrO_2 | 0 - 2 |
| TiO_2 | 0 - 2 |
| with $ZrO_2 + TiO_2$ | 0 - 2 |
| As_2O_3 | 0 - 1.5 |
| Sb_2O_3 | 0 - 1.5 |
| SnO_2 | 0 - 1.5 |
| CeO_2 | 0 - 1.5 |
| Cl^- | 0 - 1.5 |

F^- 0 - 1.5

SO_4^{2-} 0 - 1.5

with $As_2O_3 + Sb_2O_3 + SnO_2 + CeO_2$

$+ Cl^- + F^- + SO_4^{2-} \leq 1.5.$

58. (new) The glass substrate according to Claim 57, wherein said glass substrate comprises a glass in which arsenic oxide, antimony oxide, and inherent impurities are minimized.

59. (new) The glass substrate according to Claim 17, comprising at least one of (a.), (b.), (c.), (d.), (e.), (f.), (g.), (h.), and (i.), wherein (a.), (b.), (c.), (d.), (e.), (f.), (g.), (h.), and (i.) comprise:

(a.) a glass transition temperature, T_g , of more than 700 degrees Celsius to maximize heat resistance of said glass substrate;

(b.) a glass having (i.) and (ii.), wherein (i.) and (ii.) are:

(i.) a processing temperature, V_A , of at most 1350 degrees Celsius at a viscosity of 10^4 dPas; and

(ii.) a temperature of at most 1720 degrees Celsius at a viscosity of 10^2 dPas;

(c.) more than 8% by weight of B_2O_3 ;

(d.) one of: at least 18% by weight of Al_2O_3 , more than 18% by weight of Al_2O_3 , at least 20.5% by weight of Al_2O_3 , and at least 21.5%

by weight of Al_2O_3 ;

(e.) at least 0.1% by weight of ZnO ;

(f.) additionally (in % by weight):

ZrO_2 0 - 2

TiO_2 0 - 2

with $\text{ZrO}_2 + \text{TiO}_2$ 0 - 2

As_2O_3 0 - 1.5

Sb_2O_3 0 - 1.5

SnO_2 0 - 1.5

CeO_2 0 - 1.5

Cl^- 0 - 1.5

F^- 0 - 1.5

SO_4^{2-} 0 - 1.5

with $\text{As}_2\text{O}_3 + \text{Sb}_2\text{O}_3 + \text{SnO}_2 + \text{CeO}_2$

+ $\text{Cl}^- + \text{F}^- + \text{SO}_4^{2-} \leq 1.5$;

(g.) a glass in which arsenic oxide, antimony oxide, and inherent impurities are minimized;

(h.) a float glass; and

(i.) one of (I.) and (II.):

(I.) a coefficient of thermal expansion $\alpha_{20/300}$ of from 2.8 x

$10^{-6}/\text{K}$ to $3.6 \times 10^{-6}/\text{K}$; and

(II.) a density, ρ , of $< 2.600 \text{ g/cm}^3$.

60. (new) The glass according to Claim 20, wherein said glass comprises at least 0.1% by weight of ZnO .

61. (new) The glass according to Claim 60, wherein said glass has a glass transition temperature, T_g , of $> 700^\circ\text{C}$ to maximize heat resistance of said glass.

62. (new) The glass according to Claim 61, wherein said glass has (i.) and (ii.), wherein (i.) and (ii.) are:

(i.) a processing temperature, V_A , of $\leq 1350^\circ\text{C}$ at 10^4 dPas ; and

(ii.) a temperature of $\leq 1720^\circ\text{C}$ at 10^2 dPas .

63. (new) The glass according to Claim 62, wherein:

said glass is configured to be resistant to thermal shock;

said glass is configured to have a high transparency over a broad spectral range in the visible and ultra violet ranges; and

said glass is configured to be free of bubbles, knots, inclusions, streaks, and surface undulations.

64. (new) The glass according to Claim 63, wherein said glass comprises more than 8% by weight of B_2O_3 .

65. (new) The glass according to Claim 64, wherein said glass

comprises one of (i.), (ii.), (iii.), and (iv.):

- (i.) at least 18% by weight of Al_2O_3 ;
- (ii.) more than 18% by weight of Al_2O_3 ;
- (iii.) at least 20.5% by weight of Al_2O_3 ; and
- (iv.) at least 21.5% by weight of Al_2O_3 .

66. (new) The glass according to Claim 65, wherein said glass additionally comprises (in % by weight):

| | |
|------------------------------------------------------------------------------------|--------------|
| ZrO_2 | 0 - 2 |
| TiO_2 | 0 - 2 |
| with $\text{ZrO}_2 + \text{TiO}_2$ | 0 - 2 |
| As_2O_3 | 0 - 1.5 |
| Sb_2O_3 | 0 - 1.5 |
| SnO_2 | 0 - 1.5 |
| CeO_2 | 0 - 1.5 |
| Cl^- | 0 - 1.5 |
| F^- | 0 - 1.5 |
| SO_4^{2-} | 0 - 1.5; and |
| with $\text{As}_2\text{O}_3 + \text{Sb}_2\text{O}_3 + \text{SnO}_2 + \text{CeO}_2$ | |
| $+ \text{Cl}^- + \text{F}^- + \text{SO}_4^{2-} \leq 1.5.$ | |

67. (new) The glass according to Claim 66, wherein said glass

comprises a glass in which arsenic oxide, antimony oxide, and inherent impurities are minimized.

68. (new) The glass according to Claim 67, wherein said glass comprises a float glass.

69. (new) The glass according to Claim 20, comprising at least one of (a.), (b.), (c.), (d.), (e.), (f.), (g.), (h.), and (i.), wherein (a.), (b.), (c.), (d.), (e.), (f.), (g.), (h.), and (i.) comprise:

(a.) a glass transition temperature T_g of $> 700^\circ\text{C}$ to maximize heat resistance of said glass;

(b.) a glass having (i.) and (ii.), wherein (i.) and (ii.) are:

(i.) a processing temperature, V_A , of $\leq 1350^\circ\text{C}$ at 10^4 dPas;
and

(ii.) a temperature of $\leq 1720^\circ\text{C}$ at 10^2 dPas

(c.) more than 8% by weight of B_2O_3 ;

(d.) one of: at least 18% by weight of Al_2O_3 , more than 18% by weight of Al_2O_3 , at least 20.5% by weight of Al_2O_3 , and at least 21.5% by weight of Al_2O_3 ;

(e.) at least 0.1% by weight of ZnO ;

(f.) additionally (in % by weight):

ZrO_2

0 - 2

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| | |
|------------------------------------------------------------------------------------------------------------|---------|
| TiO ₂ | 0 - 2 |
| with ZrO ₂ + TiO ₂ | 0 - 2 |
| As ₂ O ₃ | 0 - 1.5 |
| Sb ₂ O ₃ | 0 - 1.5 |
| SnO ₂ | 0 - 1.5 |
| CeO ₂ | 0 - 1.5 |
| Cl ⁻ | 0 - 1.5 |
| F ⁻ | 0 - 1.5 |
| SO ₄ ²⁻ | 0 - 1.5 |
| with As ₂ O ₃ + Sb ₂ O ₃ + SnO ₂ + CeO ₂ | |
| + Cl ⁻ + F ⁻ + SO ₄ ²⁻ | ≤ 1.5; |

(g.) a glass in which arsenic oxide, antimony oxide, and inherent impurities are minimized;

(h.) a float glass; and

(i.) one of (I.) and (II.):

(I.) a coefficient of thermal expansion $\alpha_{20/300}$ of from $2.8 \times 10^{-6}/K$ to $3.6 \times 10^{-6}/K$; and

(II.) a density, ρ , of $< 2.600 \text{ g/cm}^3$.